CLAIMS

1. An actuator assembly for a firearm, comprising:

a trigger assembly having a body and a trigger formed with and projecting from said body and adapted to be engaged by a user to initiate an operational sequence;

a measuring device positioned adjacent said trigger for measuring a force applied to said trigger by the user and generating a trigger signal for initiating the operational sequence;

a compensating system for compensating for inadvertent trigger signals; and

a controller in communication with said measuring device and said compensating system for receiving and processing said trigger signal and initiating the operational sequence in response to a valid trigger signal.

2. The actuator assembly of claim 1 and wherein said compensating system comprises a second measuring device for generating a compensating signal.

3. The actuator assembly of claim 2 and wherein said second measuring device generates a compensating signal in response to application of a force or changes in environmental conditions detected by said second measuring device.

4. The actuator assembly of claim 2 and wherein said compensating system further comprises a compensating mass and wherein said second measuring device is mounted adjacent said compensating mass for generating said compensating signal.

5. The actuator assembly of claim 1 and wherein said compensating system includes a filter for filtering out a trigger signal occurring at a rate of change in said trigger signal that is outside of a desired preset range for the rate of change for said trigger signal to initiate the firing sequence.

6. The actuator assembly of claim 3 and wherein said compensating system further comprises an amplifier for combining said compensating signal with said trigger signal and producing a composite signal for enabling initiation of the operational sequence if said composite signal is within an acceptable threshold range.

7. The actuator assembly of claim 6 and further including a reference signal to which said composite signal is compared to enable initiation of the operational sequence if said composite signal exceeds said reference signal.

8. The actuator assembly of claim 1 and further comprising a voltage reference and a voltage comparator in communication with said controller, and wherein said trigger signal is compared to said voltage reference at said voltage comparator to generate an output signal for controlling the operation of the device when said trigger signal is within a desired range of said voltage reference.

9. The actuator assembly of claim 1 and wherein said first measuring device comprises a strain gauge, load cell, pressure transducer, force sensing resistor, piezo-resistive sensor, piezo electric device, conductive rubber element, force sensor, conductive film, or a semi-conductor sensing device.

10. The actuator assembly of claim 4 and further comprising a compensating cantilever extending from said body and supporting said compensating mass.

11. The actuator assembly of claim 1 and further comprising a trigger cantilever connecting said trigger to said body.

12. The actuator assembly of claim 1 and further comprising a sensitivity increasing feature formed along said body adjacent said first measuring device for localizing the force applied to said trigger for detection by said first measuring device.

13. The actuator assembly of claim 12 and wherein said sensitivity increasing feature comprises a notch, cavity or raised portion formed in said body.

14. The actuator assembly of claim 1 and wherein said body includes a cylinder having a plunger element to which said trigger is mounted, and wherein said first measuring device comprises a sensor mounted along said cylinder in a position to detect variances in force applied to said plunger element upon engagement of said trigger by a user.

15. The actuator assembly of claim 1 and wherein said body portion and said trigger comprise a substantially unitary structure such that the actuator assembly has essentially no moving parts.

16. The actuator assembly of claim 1 and wherein said compensating system comprises a temperature sensor for detecting and compensating for effects of changes in temperature acting on said trigger.

17. The actuator assembly of claim 8 and wherein said voltage reference is variable to enable adjustments to the amount of force required to be applied to said trigger for generating a trigger signal sufficient to initiate the operational sequence.

18. The actuator assembly of claim 1 and further comprising an electrically conductive probe in communication with a power supply for directing a firing voltage to a round of electrically activated ammunition.

19. The actuator assembly of claim 1 and further including a firing pin and an engagement mechanism blocking movement of said firing pin toward a round of percussion primed ammunition, and wherein said engagement mechanism is disengaged from said firing pin to enable said firing pin to engage and initiate the firing of the round of percussion primed ammunition upon receipt of said trigger signal by said controller.

20. The actuator assembly of claim 1 and further comprising a firing pin and an actuator in communication with the firing pin for moving the firing pin to a firing position for firing a round of percussion primed ammunition in response to a firing signal received from said controller upon actuation of said trigger by a user.

21. A method of firing a round of ammunition comprising:

applying a force to a trigger;

detecting application of force to the trigger and generating a trigger signal;

monitoring rate of change of the trigger signal;

monitoring the magnitude of the trigger signal and compensating for the rate of change of the trigger signal outside of a predetermined threshold range; and

if the trigger signal is of a sufficient magnitude and within the predetermined operating range, initiating an operational sequence.

22. The method of claim 21 and further comprising generating a compensating signal in response to a jarring event, combining the compensating signal generated with the trigger signal to generate a composite signal, and initiating the operational sequence if the composite signal exceeds a predetermined threshold.

23. The method of claim 21 and further comprising supplying a firing charge through a conductive firing probe to an electrically initiated primer charge in response to the firing signal to initiate explosion of the primer charge.

24. The method of claim 21 and further comprising the step of releasing a firing pin in response to the firing signal to enable the firing pin to be moved into engagement with and initiate firing of a percussion primer charge.

25. An actuator, comprising:

a trigger assembly having unitary, one-piece construction including a body and a trigger formed with and projecting form said body for engagement by a user;

a measuring device connected to said trigger assembly for detecting and measuring a force applied to said trigger by the user and in response, generating a trigger signal; and

a control system in communication with said measuring device for receiving and processing said trigger signal and initiating an operational sequence in response to a valid trigger signal.

26. The actuator of claim 25 and further comprising a compensating system for compensating for inadvertent trigger signals.

27. The actuator of claim 26 and wherein said compensating system comprises a second measuring device for generating a compensating signal.

28. The actuator of claim 27 and wherein said compensating system further comprises an amplifier for combining said compensating signal with said trigger signal and producing a composite signal for enabling initiation of the operational sequence if said composite signal is within an acceptable threshold range.

29. The actuator of claim 28 and wherein said compensating system includes a filter for filtering out a trigger signal occurring at a rate of change in said trigger signal that is outside of a desired preset range of the rate of change for said trigger signal to initiate the firing sequence.

30. The actuator of claim 25 and wherein said measuring device comprises a strain gauge, load cell, pressure transducer, force sensing resistor, piezo-resistive sensor, piezo electric device, conductive rubber element, force sensor, conductive film, or a semi-conductor sensing device.

31. The actuator of claim 25 and further comprising, a trigger cantilever connecting said trigger to said body and along which said measuring device is mounted.

32. The actuator of claim 25 and further comprising a sensitivity increasing feature formed along said body adjacent said measuring device for localizing the force applied to said trigger for detection by said measuring device.

33. The actuator of claim 25 and further comprising a compensating system for compensating for effects of temperature on said trigger assembly.

34. The actuator assembly of claim 27 and further including a threshold reference and wherein said compensating signal generated by said second measuring device is compared to said threshold reference.

35. The actuator assembly of claim 26 and wherein said compensating system comprises a means for monitoring a running average of trigger signals generated by said measuring device over a desired time.

36. The actuator of claim 25 and wherein said control system further includes a plurality of comparators for comparing said trigger signal with at least one reference signal and generating a comparator output signal.

37. The actuator of claim 25 and wherein said control system further comprises an amplifier for receiving and amplifying said trigger signal from said measuring device as said trigger is engaged and a motor speed control, wherein said amplified signal varies, as said trigger is engaged, the speed of a motor controlled by said motor speed control in proportion to the force applied to said trigger.

38. The actuator of claim 37 and wherein said control system further comprises a threshold reference and a comparator and wherein said comparator compares said amplified signal from said amplifier with a reference signal from said threshold reference to determine when said amplified signal has exceeded said threshold reference before engaging said motor speed control.